The opinion of the United States Court of Appeals for the Fourth Circuit was written by Judge Haynsworth, Circuit Judge. The case was argued on April 17, 1958, and decided on August 29, 1958. The opinion is as follows:

HAYNSWORTH, Circuit Judge:

The plaintiff was a passenger in an automobile, owned and driven by his wife, when there was a blowout of the right front tire. Mrs. McDavid lost control of the automobile, which ran into a ditch, and the plaintiff was thrown to the floor. He sought compensation for his personal injury from the manufacturer of the automobile upon the theory that the blowout was caused by excessive wear of the tire which, in turn, was attributable to negligence of the manufacturer in aligning the wheel. The defendant's motions for a directed verdict and, after the verdict, for judgment notwithstanding the verdict were denied. The appeal presents the question of the sufficiency of the proof to support the verdict.

Although the automobile had been driven only 2600 miles, the blowout occurred because the tire had worn through the fabric. The wear of the left front tire was less extensive, but greatly excessive for the distance travelled.

From the appearance of the tires, it was established that a major cause of the excessive wear was the "toe-in" of the front wheels. Toe-in is adjusted by turnbuckles on the tie rods by means of which the front wheels may be rotated on their vertical axes. Proper front wheel alignment on most automobiles requires a small degree of toe-in, so that the distance between the center lines of the two tires measured at the front is less than the distance between them measured at the rear of the tires. Obviously, if there is too much toe-in, the front tires will scrape and scuff along the roadway, and wear will be rapid and excessive. Toe-in may be so maladjusted as to cause new tires to wear-out in a few hundred miles of travel.

It is apparent that the center of the wear of the right front tire of the McDavid automobile did not coincide with the center line of the tire, and the outer edge shows greater wear than the inner. This indicates maladjusted camber. Proper front wheel settings require some positive camber,

a tilting of the wheel along its horizontal axis so that the distance between the two front tires is greater at their tops than at the road surface. The weight and springing of the loaded vehicle counteracts optimum positive camber, however, so that the center line of tire wear should coincide approximately with the center line of the tire's tread. Excessive positive camber shifts the center line of wear outwardly from the center line of the tread and will reduce the useful life of the tread.

The witnesses differed greatly in their estimates of the contribution of the camber adjustment to the excessive wear of the right front tire. Some thought it negligible, explaining that excessive toe-in causes more rapid wear of the right front tire than of the left.[1] A witness for the plaintiff, however, attributed the difference in the wear of the two front tires entirely to excessive camber in the right front wheel.

While it is obvious that the scraping action which excessive toe-in occasions can quickly result in complete tire failure and that excessive camber holds no comparable threat of early danger, it is apparent from the foregoing that the proof established that failure of the tire was caused by misalignment of the front wheels and would warrant a finding that the misalignment consisted of a combination of excessive toe-in and excessive camber in the right front wheel. The plaintiff, however, could carry in no such satisfactory manner his burden of proving that Ford Motor Company was responsible for the condition which existed at the time of the accident.

This particular automobile was delivered by Ford in February 1954 to Clem Davis, Inc., an authorized Ford dealer in Jackson, Michigan. It was held in stock there for almost six months, until August 23, 1954, when it was sold to Mrs. McDavid. Meanwhile, however, on August 14, 1954,

[1] Since toe-in is controlled by tie rods connecting the two wheels, it affects each equally if the vehicle is operated on a flat surface. On crowned roads, however, the natural tendency of the vehicle to move toward the lower edge of the roadway is countered by slight steering pressure to the left. This steering pressure reduces the excessive toe-in of the left front wheel and increases that of the right. The right wheels, on crowned roads, also bear the greater weight.

the power steering with which it had been equipped was removed for installation upon another automobile and was replaced by conventional steering. This exchange included the tie rods and other members of the steering linkage, so that all of the controls of the toe-in, as set in the factory, were completely removed and replaced by others. The toe-in was then reset with the controls associated with the substituted steering apparatus. Whatever the toe-in adjustment immediately after the exchange of power steering for conventional steering, it was the work of Clem Davis, Inc., not of Ford Motor Company.

Camber, under the procedures followed by Ford at that time, was gaged and tested by machine. Camber, itself, as caster, the rearward inclination of the top of the kingpin, is adjusted on Ford automobiles of that model year by the insertion or removal of shims, or fillers, on bolts at two control points. Each testing machine is checked each four hours, and, if found to be inaccurate, there is a manual re-check of the caster and camber settings on all cars which had passed through during the preceding four-hour period.

In addition to the machine tests of the camber setting at the factory, there is testimony that this factor in wheel alignment and the toe-in were checked on the McDavid automobile, (1) by Clem Davis, Inc., on August 14, 1954, when the exchange of the steering systems was accomplished, (2) by Clem Davis, Inc., on August 23, 1954, as part of the routine pre-delivery procedure, at which time the original tires were replaced with others, (3) by Clem Davis, Inc., on August 31, 1954, as part of the "300 mile inspection," and (4) by Eger Motors, Inc., of McKeesport, Pa., as part of the "1000 mile inspection." The mechanics who did the work did not recall the particular automobile, but they described the procedure and testified generally that if the camber or toe-in was maladjusted, their checks would have revealed the fact and it would have been corrected.

At the time of the "1000 mile inspection," the actual mileage was 1287, approximately half of the total mileage at the time of the accident. If the misalignment which caused the complete failure of the tire at 2600 miles was

present at the time of purchase, the wear, particularly the feather edges characteristic of wear from excessive toe-in, should have been obvious upon the most casual inspection at 1287 miles.

Alignment of front wheels requires the coordinate adjustment of several related angles. Disruption of one may affect others, and perfect alignment is not so permanent that it may not become maladjusted in the course of normal use. Excessive toe-in and excessive camber can be caused by hitting a curb while parking diagonally against it, by glancing blows, when driving, against curbs, pavement edges, railroad tracks, holes and bumps. The plaintiff's principal expert said of excessive toe-in, "It can also be caused by the type roads the person drives over. I have a few farmers as my customers. And they really take a terrific licking out there. You know, some of them go through the pasture with their cars and so forth and hitting holes in the road * * *." One of the witnesses also testified that excessive toe-in, itself, increases positive camber, because of the great pressure under weight against the bottom of the scuffing tire.

Mrs. McDavid testified that from the time of her purchase of the car, she alone drove it, except on one occasion in Michigan and she was a passenger in the automobile then. She had parked it diagonally to curbs, but very carefully, and she did not recall having hit a bump or a hole. In parking lots, she said, she always parked the car herself, "and I usually parked it into a place where I can lock it and the attendants wouldn't have to move it."

Mrs. McDavid was asked, however, if "just prior to the accident" she had noticed her tires "squeaking." She replied that she had, that on turns, even at slow speeds, they would screech. Excessive toe-in will cause tires to screech at normal speeds on curves, but it is significant that she does not suggest that this screeching, even at slow speeds, was noticeable during the early weeks of her use of the automobile.[2] At the time of the first inspection, she had complained of a noise in the radio and, at the second inspec-

[2] Mr. McDavid, the plaintiff, did not testify.

tion, of vibration in the left side of the dash, but, apparently, she made no mention of screeching tires.

We held in *Pierce v. Ford Motor Co.*, 4 Cir., 190 F. (2d) 910, applying the laws of Virginia, that an automobile manufacturer was liable in a tort action for injuries sustained by occupants of a new automobile, driven only 900 miles, when it appeared that the turnbuckles on the tie rods were not secured in the final assembly of the car, so that in use they turned, causing excessive toe-in, the complete failure of one of the front tires and the resultant injuries. We need not consider whether a similar conclusion would be reached under the laws of South Carolina[3] if the proof

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[3] In this case in the diversity jurisdiction, we look to the laws of South Carolina, where the action was tried, first, to determine how she would resolve the conflict of laws question. The general rule, in similar tort cases, is that the controlling laws are those of the state in which the injury is suffered rather than those of the state in which the defendant acted. It has been tacitly applied by the Supreme Court of South Carolina. *Burnette v. Augusta Coca-Cola Bottling Co.*, 157 S. C. 359, 154 S. E. 645. See, also, *Klaxon Company v. Stentor Electric Manufacturing Company*, 313 U. S. 487, 61 S. Ct. 1020, 85 L. Ed. 1477; *Pierce v. Ford Motor Co.*, 4 Cir., 190 F. 2d 910; *Rogers v. White Metal Rolling and Stamping Corporation*, 2 Cir., 249 F. 2d 262; *Wright v. Carter Products, Inc.*, 2 Cir., 244 F. 2d 53; *Carpini v. Pittsburgh and Weirton Bus Company*, 3 Cir., 216 F. 2d 404; *Sanders v. Glenshaw Glass Co.*, 3 Cir., 204 F. 2d 436; *Moran v. Pittsburgh-Des Moines Steel Co.*, 3 Cir., 166 F. 2d 908; *Reed & Barton Corporation v. Maas*, 1 Cir., 73 F. 2d 359. We follow the general rule and conclude that South Carolina would apply her laws, since the accident occurred in that state.

The Supreme Court of South Carolina has had little occasion to consider the rule of *MacPherson v. Buick Motor Co.*, 217 N. Y. 382, 111 N. E. 1050. Though a violation of her Pure Food and Drug Act involves somewhat different considerations, it is established in South Carolina that a manufacturer of products for human or animal consumption is liable in a tort action for injuries or losses caused by a deleterious product. *Gantt v. Columbia Coca-Cola Bottling Co.*, 193 S. C. 51, 7 S. E. 2d 641; *Hunt v. Allied Mills*, 184 S. C. 330, 192 S. E. 356. In *Odom v. Ford Motor Company*, 230 S. C. 320, 95 S. E. 2d 601, the Supreme Court of South Carolina held that the manufacturer was not liable in a tort action for economic loss caused by a defect in a tractor, but approving recognition was accorded the general rule. Mr. Justice Oxner said, "* * * The current trend is to enlarge the liability of the manufacturer to a remote vendee to include any article or product which if negligently made or prepared may reasonably be anticipated to cause injury to those properly using it. * * *."

In the light of what it has said, and at this late date, we would be wholly unrealistic if we assumed that the Supreme Court of South Carolina would now apply the unduly restrictive and long discredited limitation which recognizes no obligation of a manufacturer except to those in privity of contract with him claiming under a breach of warrant. See *Pierce v. Ford Motor Co.*, 4 Cir., 190 F. 2d 910.

showed that the camber of a front wheel was misset at the factory, a condition which will shorten the useful life of the tire tread, but which, unlike loose turnbuckles and excessive toe-in, will permit many thousands of miles of safe operation before it, alone, can create a present threat of danger,[4] for we think the proof insufficient to support the inference that the factory setting of the camber was excessive in this instance.

Examination of the automobile after the accident disclosed no mechanical defect, nor any error or omission in the assembly or adjustment of the parts, which could have caused the wheels to become misaligned. The testimony indicates that all parts were present, intact, tight and in proper order, except for the damage they had sustained in the accident. Unlike the situation in *Pierce v. Ford Motor Co., supra*, there is nothing in the record to show how or when the front wheels became misaligned. All that is known arises out of the appearance of the tires, from which we may infer without doubt that the automobile had been operated for a time with its front wheels badly out of alignment, but how this came to be, and when, is left to surmise.

The maladjusted toe-in could have been introduced by the mechanic at Clem Davis, Inc., who set it after exchanging the steering systems, by one of the other mechanics who subsequently inspected and checked the wheel alignment (though their relevant work sheets do not indicate they changed this adjustment), by a parking lot attendant on one of those infrequent occasions when Mrs. McDavid was unable to park the car in a position from which it was un-

[4] In South Carolina, a manufacturer of a chattel is not liable to a remote vendee for loss caused by a defect which does not make the chattel dangerous in its normal use. *Odom v. Ford Motor Company*, 230 S. C. 320, 95 S. E. 2d 601. See *Wyatt v. Cadillac Motor Car Division*, 145 Cal. App. 2d 243, 302 P. 2d 665. Inevitably, tires wear out, and, if not replaced in time, they become dangerous and will fail. Though a manufacturer may be liable if a defect causes failure of a tire so quickly that the owner's duty of inspection and replacement may not be said reasonably to have arisen, the same result does not necessarily follow if the defect, alone, adversely affects the life of the tire not so immediately or substantially, though, in combination with a condition subsequently arising, it may be said to have contributed to the failure of the tire. See *Hentschel v. Baby Bathinette Corp.*, 2 Cir., 215 F. 2d 102; *Cohen v. Brockway Motor Truck Corp.*, 240 App. Div. 18, 268 N. Y. S. 545.

necessary to move it, or by one or more of the infinite variety of bumps and blows which could have changed the toe-in adjustment during Mrs. McDavid's normal use of the automobile. All that is known with certainty is that it was not caused by the defendant, for, whatever Ford did to set the toe-in, it was completely undone by Clem Davis, Inc.

The excessive camber could have been introduced by Ford when it initially made the adjustment during assembly of the automobile. But it also could have been caused by any one of the mechanics who inspected and checked the camber (including the one who exchanged the steering systems, though the exchange of itself would not alter the camber setting), by a parking lot attendant, or by any one of the infinite variety of bumps and blows, to her, apparently insignificant, which the front wheel might well have sustained during Mrs. McDavid's use of the automobile.

If it were shown that the wheels were misaligned by Ford, it should not be relieved of its responsibility because a dealer under a duty to inspect and correct defects may have been negligent in the performance of its duty. That the excess of camber was not the work of Ford, however, is indicated by (1) its own procedures designed to assure proper camber settings, (2) the repeated, subsequent inspections and checks, which disclosed no fault in the setting and which were made by two different, widely separated dealers, (3) the fact that the last inspection was made at a time when excessive toe-in, if present from the time of purchase, would have been obvious in a most casual inspection of the tire, (4) the fact that a related, and extremely important, factor in wheel alignment was badly maladjusted by someone or by some occurrence for which Ford was in no way responsible, and (5) the fact that Mrs. McDavid noticed the screeching of her tires at low speeds, an indication of the misalignment, not when the car was first purchased, but, apparently, only after the last of the several occasions upon which the wheel alignment was tested and checked.

The old notion that a jury should not be allowed to draw any inference from circumstantial evidence, if the one is as probable as the other, has fallen into discard and

has been replaced by the more sensible rule that it is the province of the jury to resolve conflicting inferences from circumstantial evidence. Permissible inferences must still be within the range of reasonable probability, however, and it is the duty of the court to withdraw the case from the jury when the necessary inference is so tenuous that it rests merely upon speculation and conjecture.

We think that the inference that Ford was responsible for the misalignment of the right front wheel was so tenuous and conjectural that the defendant's motions should have been granted. There is nothing which points to the defendant, rather than to the many others who subsequently dealt with the car, as the responsible agent; there is much to indicate it was not. Particularly is this true when it is known that camber settings can become altered in ordinary use and the sole predicate of the inference is the appearance of the tire after 2600 miles of operation. *Attaway v. One Chevrolet 5-P Truck*, 228 S. C. 559, 91 S. E. (2d) 270; *Eickhoff v. Beard-Laney, Inc.*, 199 S. C. 500, 20 S. E. (2d) 153; *Leek v. New South Express Lines*, 192 S. C. 527, 7 S. E. (2d) 459; *Delk v. Liggett & Meyers Tobacco Co.*, 180 S. C. 436, 186 S. E. 383; *Smith v. General Motors Corporation*, 5 Cir., 227 F. (2d) 210.

Many cases, recognizing the rule of a manufacturer's liability in tort actions, nevertheless, have denied recovery because of failure of the proof to establish all of the substantive elements of the wrong or because the necessary inferences are so tenuous and speculative that they may not be reasonably drawn from the circumstantial evidence. See: *Smith v. General Motors Corporation*, 5 Cir., 227 F. (2d) 210; *Lovas v. General Motors Corp.*, 6 Cir., 212 F. (2d) 805; *Davlin v. Henry Ford & Son, Inc.*, 6 Cir., 20 F. (2d) 317; *Green v. Orion Shipping and Trading Co., Inc.*, D., Md., 139 F. Supp. 431; *Sugai v. General Motors Corporation*, D. Idaho, 137 F. Supp. 696; *Senter v. B. F. Goodrich Company*, D. Colorado, 127 F. Supp. 705; *O'Hara v. General Motors Corporation*, E. D., Mich., 35 F. Supp. 319; *Harward v. General Motors Corp.*, 235 N. C. 88, 68 S. E. (2d) 855; *Hirst v. Chevrolet Motor Co.*, 261 Mass. 155, 158 N. E. 332; *Darnell v. Beard*, ... Ky. ...., 296 S. W. (2d) 743;

Ayers v. Amatucci, 206 Okla. 366, 243 P. (2d) 716; *Fisher v. Sheppard*, 366 Pa. 347, 77 A. (2d) 417; *Reusch v. Ford Motor Co.*, 196 Wash. 213, 82 P. 556; *Tralli v. Triple X Stores, Inc.*, 19 Conn. Sup. 293, 112 A. (2d) 507; *Kalinowski v. Joseph T. Ryerson & Son, Inc.*, 242 App. Div. 43, 272 N. Y. S. 759.

The judgment of the District Court will be reversed and the case remanded for the entry of judgment for the defendant.

Reversed.